INORGANIC QUALITATIVE ANALYSIS

	EXPERIMENT	OBSERVATION	INFERENCE
	PRELIMINARY ANALYSIS		
1.	Noted Colour and appearance of salt	a) Colourless crystals b)Colourless amorphous	Absence of Cu^{2+}, Fe^{2+}, Mn^{2+},etc. Maybe carbonates
2.	Noted the solubility in water	a) Soluble b)Insoluble	May be halides, Nitrates, sulphates May be carbonates
3.	**Flame test** A little of salt is made into a paste with conc. HCl. A little of this paste is taken on a glass rod and shown to the non-luminous Bunsen flame.	a) Pale green flame b) Brick red flame c)Crimson red flame	Presence of Ba^{2+} Presence of Ca^{2+} Presence of Sr^{2+}
4.	**Ash Test** A little of the salt is mixed with a few drops of conc. HNO_3 and cobalt nitrate solution. A multi-folded filter paper is	a) A blue tinted ash b) A green tinted ash	Presence of Al^{3+} Presence of Zn^{2+}

	soaked in this and burnt to ash.	c)A pink tinted ash	Presence of Mg^{2+}
1.	**Tests for Acid Radicals (Anions)** **a) Test for carbonate(CO_3^{2-})** A little of the salt is treated with dil. HCl **Confirmatory test for CO_3^{2-}** A little of the salt is treated with dil. HCl and the evolved gas is passed through limewater	Brisk effervescence with liberation of a colourless, odourless gas Lime water turns milky	Presence of CO_3^{2-} Presence of CO_3^{2-} confirmed
2.	**a) Test for Chloride (Cl^-)** A little of the salt is treated with a few drops of conc. H_2SO_4 **Confirmatory test for chloride** 1mL of salt solution is acidified with dil. HNO_3 and a few drops of $AgNO_3$ solution is added	a) A colourless gas giving dense white fumes with ammonia solution on a glass rod a) A curdy white precipitate completely soluble in NH_4OH	Presence of Cl^- Presence of Cl^- confirmed

3.	**a) Test for Nitrates (NO_3^-)** A little of the salt is Treated with conc. H_2SO_4 and warmed. To this 1-2 pieces of copper turnings are added confirmatory for NO_3^- **Confirmatory test for NO_3^- (Brown ring test)** To a little of the aqueous solution of the salt a few drops of dil. H_2SO_4 followed by a few drops of freshly prepared $FeSO_4$ solution are added. Conc. H_2SO_4 is added along the sides of the test tube slowly by slightly tilting it.	Reddish brown fumes and the solution turns greenish-blue A brown ring at the junction of two liquids	Presence of NO_3^- Presence of NO_3^- confirmed
4.	**a) Test for Sulphate (SO_4^{2-})** To a little of the aqueous solution of the salt a few drops of dil. HCl and $BaCl_2$ solutions are added.	A thick white precipitate	Presence of SO_4^{2-}

	Confirmatory Test for SO_4^{2-} To a little of the aqueous solution of the salt, 1-2 drops of acetic acid and lead acetate solutions are added.	A thick white precipitate	Presence of SO_4^{2-} confirmed
	Test for Basic Radicals (Cations)		
a)	**Detection of Groups**		
1.	**Test for Group Zero (NH_4^+ - Ammonium)** To a small amount of the salt add NaOH solution and shake (warm).	A pungent smelling gas giving dense white fumes with conc. HCl taken on a glass rod	Presence of NH_4^+
	Confirmatory test for NH_4^+ To the above solution add Nessler's reagent drop wise	A chocolate brown precipitate is formed	Presence of NH_4^+ confirmed

***Original salt solution is prepared by dissolving the salt in water. If the salt is insoluble, make the solution in dilute HCl.**

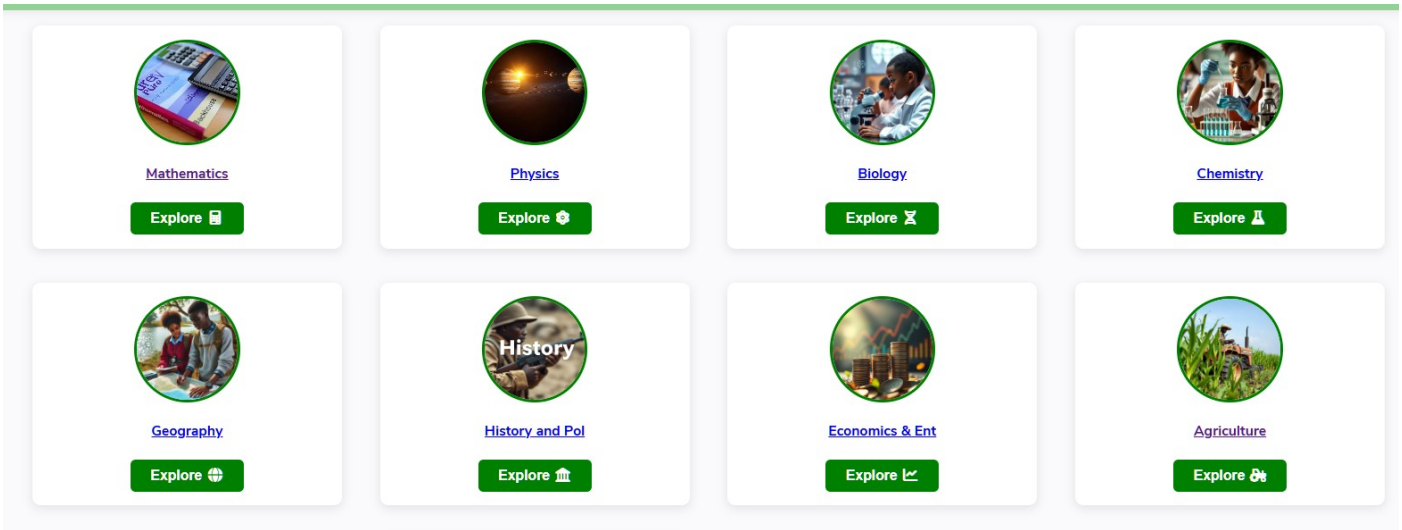
2.	**Test for group I (Pb^{2+} – Lead)** To a little of the salt solution dil. HCl is added. **Confirmatory test for group I (Pb^{2+})** Divide salt solution into two parts:	A thick white precipitate (dissolving on warming with water).	Presence of group I (Pb^{2+})
1.	To one part add K_2CrO_4 (Potassium chromate) solution	A yellow precipitate	Presence of Pb^{2+} confirmed
2.	To the second part add KI (Potassium Iodide) solution	A yellow precipitate	Presence of Pb^{2+} confirmed
3.	**Test for group II (Cd^{2+} – Cadmium)** To a little of the salt solution, dil. HCl is added and H_2S gas is passed. **Confirmatory Test for Group II (Cd^{2+})**	a) A yellow precipitate	Presence of Cd^{2+}
1.	To a little of the salt solution NaOH solution is added.	A white precipitate	Presence of Cd^{2+} confirmed
2.	To a little of the salt solution potassium ferrocyanide $K_4[Fe(CN)_6]$ is added	A bluish white or greenish white precipitate	Presence of Cd^{2+} confirmed

4.	**Test for group III (Al^{3+} – Aluminium)** To a little of the salt solution add excess NH_4Cl solution and NH_4OH (Ammonia solution) **Confirmatory test for Group III (Al^{3+})**	A gelatinous white Precipitate	Presence of group III (Al^{3+})
1.	The gelatinous white Precipitate is dissolved in minimum quantity of dil. HCl. A drop of blue litmus solution is added followed by NH_4OH.	A blue lake is formed on the surface of the solution	Presence of Al^{3+} confirmed
2.	Ash test performed	Blue tinted ash	Presence of Al^{3+} confirmed
5.	**Test for group IV (Zn^{2+} - Zinc)** To a little of salt solution add excess NH_4Cl solution, NH_4OH and H_2S gas is passed.	A dull white precipitate	Presence of group IV (Zn^{2+})

	Confirmatory test for group IV (Zn^{2+})		
1.	To a little of the salt solution dil. NaOH is added.	A white precipitate soluble in excess of NaOH	Presence of Zn^{2+} confirmed
2.	To a little of the salt solution $K_4[Fe(CN)_6]$ is added.	A bluish white or greenish white precipitate	Presence of Zn^{2+} confirmed
3.	Ash test performed	Green tinted ash	Presence of Zn^{2+} confirmed
6.	**Test for group V [Ba^{2+}(Barium) , Sr^{2+} (Strontium), Ca^{2+} (Calcium)]**		
	To a little of salt solution add excess NH_4Cl solution, NH_4OH and $(NH_4)_2CO_3$ are added in sequence.	A thick white precipitate	Presence of group V (Ba^{2+}, Sr^{2+}, Ca^{2+})
	Analysis for group V		
	***Group V precipitate is dissolved in minimum quantity Acetic acid and is divided into 3 parts** (test tubes).		
	Confirmatory test for Ba^{2+}		
1.	To the first part add K_2CrO_4 (Potassium Chromate) solution.	A yellow precipitate	Presence of Ba^{2+} confirmed
2.	Flame test performed	Green coloured flame	Presence of Ba^{2+} confirmed

	Confirmatory test for Sr^{2+}		
1.	To the second part add $(NH_4)_2SO_4$ (Ammonium sulphate) solution	A scanty white precipitate	Presence of Sr^{2+} confirmed
2.	Flame test performed	Crimson red flame	Presence of Sr^{2+} confirmed
	Confirmatory test for Ca^{2+}		
1.	To the third part add $(NH_4)_2C_2O_4$ (Ammonium oxalate)	A thick white precipitate	Presence of Ca^{2+} confirmed
2.	Flame test performed	Brick red flame	Presence of Ca^{2+} confirmed
7.	**Test for group VI (Mg^{2+})**		
	To a little of the salt solution excess NH_4Cl solution, NH_4OH and Disodium hydrogen Phosphate (Na_2HPO_4) are added.	White precipitate Formed	Presence of group VI (Mg^{2+})
	Confirmatory test for group VI (Mg^{2+})		
1.	To salt solution add NaOH solution and 2-3 drops of Magneson reagent	A blue precipitate	Presence of Mg^{2+} confirmed
2.	Ash test performed	Pink tinted ash	Presence of Mg^{2+} Confirmed

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